

TOWN OF CONCORD, MASSACHUSETTS

COMPREHENSIVE WASTEWATER MANAGEMENT PLAN SUMMARY

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FIGURE S-1

TOWN OF CONCORD, MASSACHUSETTS

COMPREHENSIVE WASTEWATER MANAGEMENT PLAN:

RECOMMENDED PLAN ÅREAS

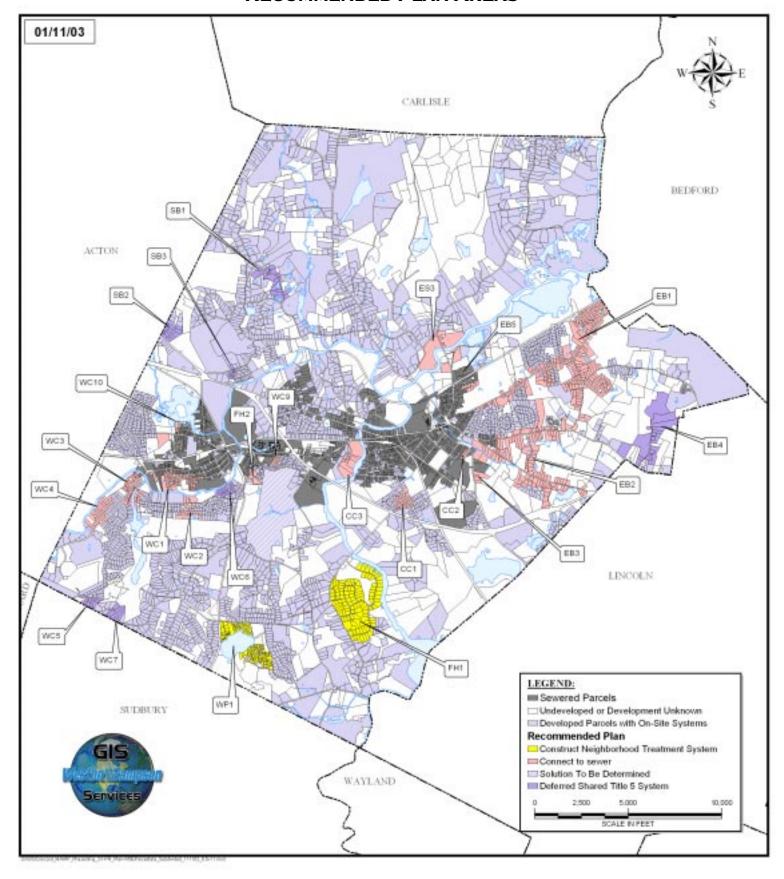


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EXECUTIVE SUMMARY

INTRODUCTION

In 1999, the Town of Concord began developing a comprehensive wastewater management plan (CWMP) for town-wide wastewater management. Such a plan is important for several reasons, including:

- It is a legal requirement because the Town's Wastewater Treatment Plant flow has reached 80% of its permitted capacity.
- It allows the Town to move ahead and help many homeowners and neighborhoods that have been waiting for municipal wastewater management assistance since at least the 1980's.
- The plan provides for important environmental, public health, aesthetic and financial benefits.
- Generally it is more cost-effective to provide community solutions rather than to leave it up to each affected homeowner.
- It makes sense to carefully plan for the Town's future.

This planning process began when the consulting firms of Stone Environmental, Inc. and Lombardo Associates, Inc. were selected and a Wastewater Planning Committee (WPC) was appointed. The initial tasks (Phase I) of the consultants were 1) to assess current and future wastewater needs by examining existing conditions throughout the town and 2) to analyze potential alternatives for wastewater management in areas of town with current and potential wastewater disposal problems. The WPC provided guidance and advice to staff and consultants during the planning process.

Weston & Sampson Engineers, Inc., was retained to complete Phase II of the wastewater planning process. This phase involved finalizing the recommended alternatives for town-wide wastewater management to the point where the plan can be presented to Town Meeting. At the 2003 Town Meeting, citizens will have the opportunity to vote in support of

the CWMP (Article 36) and for design funding of the recommended first phase of the proposed 4-phase project (Article 37). Both actions will help in the regulatory acceptance of the plan.

RECOMMENDED PLAN

The Recommended Plan provides solutions for nearly 1,000 parcels, about 50% of which were identified as having a high probability of needing an alternative form of wastewater management to the conventional on-site (Title 5) system. Approximately 75% of the parcels in the Recommended Plan will be connected to the existing centralized sewer system, which currently serves approximately 30% of the town. The majority of the parcels proposed for sewering are located in either the Elm Brook or West Concord areas of town. The remaining 25% of parcels in the Recommended Plan are proposed for connection to one of two neighborhood treatment systems: one to serve the White Pond area and one to serve the Conantum (Kalmia Woods Association) area.

PUBLIC PARTICIPATION

To ensure that the CWMP is consistent with the needs and views of the Concord community, extensive public participation efforts were made throughout the wastewater planning process. Approximately ten WPC meetings, five neighborhood meetings and four community meetings were held during Phase I of this project. An additional sixteen WPC meetings, five neighborhood meetings and one community meeting were held, to date, during Phase II of the project: a total of 41 meetings in addition to regular briefings provided to Town boards and committees. The WPC has also published sixteen Newsletters, to date, which cover the main topics of the meetings and explain the many details of the planning process. Copies of these Newsletters are available on the town's website at the following address: www.concordnet.org/ dpw/w&s/html/newsletters.htm.

BACKGROUND

NEEDS ASSESSMENT

¬ he initial step in the comprehensive wastewater management planning process was the identification of areas of town with longterm challenges to using on-site wastewater treatment and disposal systems. In Massachusetts, Section 310 CMR 15.000, The State Environmental Code, Title 5, governs standard requirements for on-site systems. These regulations are administered through the local Board of Health. Present day on-site systems are usually called 'septic systems' or 'Title 5 systems.' These typically include a buried tank (septic tank) to separate the solids and floating waste (grease) from the wastewater, after which the remaining liquid, or 'effluent,' flows to a buried system of pipes (leaching field) that spreads it to the ground for biological treatment and soil filtering. On-site systems for parcels with limited space have a septic tank, but use a leaching pit for spreading the wastewater into the ground. In very old systems, the wastewater goes into a single 'cesspit' or 'cesspool' and then directly into the ground. Cesspools and systems with leaching pits are less desirable in that they provide less treatment and may not meet Title 5 requirements.

CHALLENGES TO USING ON-SITE SYSTEMS:

• Insufficient space Some Concord residents have small parcels that have insufficient space to properly site an on-site system under Title 5 without obtaining variances from the Board of Health. Variances for small parcels with insufficient space can potentially have adverse impacts to adjacent properties.

- Proximity to resource areas Another challenge is the proximity of many on-site systems to wetlands or floodplain. These environmentally sensitive areas require additional setbacks to protect them from potential wastewater impacts. This may limit the space available to properly locate an on-site system without obtaining variances from the Board of Health, which could diminish the protection of resource areas.
- High groundwater A third challenge for adequate wastewater treatment is the high groundwater in some areas. High groundwater is an issue because adequate removal of substances such as nitrates and phosphates, as well as pollutants and pathogens, takes place as the effluent filters through the ground below the leaching area. If there is not enough separation between the leaching system and the groundwater level, limited treatment occurs and these substances may enter the groundwater. This is a concern for two reasons: first, because the town obtains the majority of its drinking water, both municipal and private, from the groundwater supply; and second, because of the impact on wetlands and other environmental resources. In order to protect groundwater, Title 5 requires a 4-foot separation between the leaching system and the groundwater level (for new on-site systems). Many parcels in areas of high groundwater have been and will continue to be required to build mounded leaching systems to achieve this separation. Mounded systems can be less than desirable aesthetically and are often more costly to construct.
- Soils and bedrock Some parcels have challenges involving the type of soil that exists in their area or with the presence of bedrock close to the ground surface. These are difficult challenges to overcome and typically require the footprint of the leaching area to be larger or mounded, which again leads to more costly construction and more challenging land-scaping.

Taking all of these factors into consideration, Stone Environmental and Lombardo Associates developed a computerized model to determine on a parcel-byparcel basis what areas of Concord would be most likely to experience challenges with on-site wastewater systems both now and in the future. The information used in this assessment included general information on soil types, estimated groundwater depths, surficial geology, and wetland and floodplain areas, supplemented with Concord-specific information from the town's extensive Geographic Information System (GIS), Board of Health data, and other Town government records. All this information is now available electronically, via an Integrated Wastewater Management System (IWMS) database that was created as part of this planning process.

The assessment resulted in the identification of parcels that would likely be unable to support an onsite system without some type of Board of Health variance. These parcels would therefore need an alternative wastewater management solution (such as connection to the existing centralized sewer system) to overcome the existing and potential challenges for an on-site system and to minimize the granting of variances. While this assessment provided a parcel-by-parcel designation of wastewater needs, the parcel designations were used for planning purposes only and are not intended to replace actual Title 5 inspection results.

The results of this analysis are presented in the report titled, "August 21, 2000, Comprehensive Wastewater Management Plan, Volume 1 – Needs Assessment, Town of Concord, Massachusetts," and on a map titled, "NEEDS ASSESSMENT- PARCELS REQUIRING SOLUTIONS, Comprehensive Wastewater Management Plan, Concord, Massachusetts, October 12, 2000," both of which can be viewed at the town's website at the Concord Public Works home page under the Wastewater Planning Committee link, See Table S-1 below.

TABLE S-1 SUMMARY OF NEEDS ANALYSIS RESULTS					
	Nur	Total Developed/			
Neighborhood Area	Off-site is Preferred	On-site is Possible	No Problem was Identified	Neighborhood Parcels	
West Concord	140	45	863	1,048	
Elm Brook	106	134	618	858	
White Pond	75	0	40	115	
Concord Center	42	47	337	426	
Fairhaven	32	73	541	646	
Spencer Brook	31	122	326	479	
Estabrook	<u>11</u>	<u>76</u>	<u>190</u>	<u>277</u>	
Total Problem Parcels	437	497			
Town-wide Parcels	93	3 4	2,915	3,849	

PRELIMINARY ALTERNATIVES ANALYSIS

The second step in the CWMP process was the evaluation of the alternatives available for the areas of town with parcels having 'needs' as identified in the Needs Assessment. The general term for these alternatives is off-site systems.

AVAILABLE ALTERNATIVES/OFF-SITE SYSTEMS:

- Centralized sewer system The Town of Concord has a limited system of sewers that collects wastewater (flow) from residences, businesses and institutions and transports this flow to a municipal wastewater treatment plant (WWTP) located off Bedford Street. The sewer system currently receives flow predominantly from the Concord Center area as well as from portions of the West Concord and Elm Brook areas (see Figure S-1). Flow is treated at the WWTP and discharged to the Concord River.
- Decentralized cluster/neighborhood treatment systems (NTS) This type of off-site system collects wastewater from a smaller, localized area and requires construction of a smaller, neighborhood treatment and groundwater disposal system. This type of off-site system is relatively new compared to centralized sewer systems, but offers the benefit of groundwater recharge with higher quality effluent than individual on-site systems. Groundwater recharge is the term used for putting water back into the same area from which it was taken, in order to replenish the groundwater.

A neighborhood treatment system generally includes below-ground tankage and small-scale wastewater treatment components/equipment, which are often enclosed in a small above-ground structure. Ground-water disposal systems are similar to leaching fields used in on-site systems, but they generally have a larger footprint designed to process greater flows of high quality effluent and they require a State permit to discharge the effluent to the ground.

• Shared Title 5 systems This off-site alternative is the most similar to conventional on-site systems. Typically, shared Title 5 systems are large on-site systems located on a vacant parcel or a vacant portion of a larger developed parcel in a neighborhood where individual lots have challenges in siting on-site systems. In most instances, shared systems are made up of a large septic tank and a larger leaching field. On occasion, however, in environmentally sensitive areas, these systems require additional components/ equipment to provide an increased level of treatment. These systems generally serve a collection of less than thirty, average-size (3-bedroom) homes and can be as small as just a few homes sharing a system on the property of one or several homeowners.

PARCELS WITH NEEDS GROUPED INTO SUBAREAS

In order to evaluate what off-site alternative(s), if any, would be best suited for the various areas of town identified in the Needs Assessment, Lombardo Associates, Inc. grouped collections of parcels with 'needs' into subareas. A total of thirty-three subareas were formed. The consultant then considered the different off-site alternatives and did a preliminary analysis to determine which alternative was most cost-effective for each subarea. Further detail regarding this analysis is presented in the report titled, "October, 2000, Comprehensive Wastewater Management Plan, Volume 2 – Alternative Solutions and Implementation Issues, Town of Concord, Massachusetts," available on the town's web-site.

MAXIMUM AND MINUMUM PLANS

The results of this preliminary alternatives analysis were presented in two scenarios, the 'Maximum Plan' and the 'Minimum Plan.' The Maximum Plan provided recommended off-site solutions for all thirty-three of the subareas evaluated. The Minimum Plan provided recommended off-site solutions for twenty-two of the subareas evaluated and proposed that the remaining eleven subareas should be able to overcome on-site challenges without requiring off-site wastewater treatment. The results of each scenario

are presented on two maps titled, "MAXIMUM AREAS PROPOSED FOR OFF-SITE SOLUTIONS (TOWN-WIDE), Comprehensive Wastewater Management Plan, FIGURE 2-2, Concord, Massachusetts, October 12, 2000" and "MINIMUM AREAS PROPOSED FOR OFF-SITE SOLUTIONS (TOWN-WIDE), Comprehensive Wastewater Management Plan, FIGURE 2-3, Concord, Massachusetts, October 12, 2000."

The completion of the preliminary alternatives analysis brought Phase I of the planning process to a close. Phase II planning began in Fall 2001. Tasks under this phase and results to date are described below.

FINAL ALTERNATIVES ANALYSIS

Building on the results of the Needs Assessment and Preliminary Alternatives Analysis, Weston & Sampson Engineers, Inc. performed a final analysis of the off-site alternatives for each subarea. The results were then formalized in a town-wide recommended plan for wastewater management.

PRIORITIZATION MATRIX

The final alternatives analysis included a matrix method of evaluation. Information from the Needs Assessment and the Preliminary Alternatives Analysis was collated into this matrix and used to prioritize the order in which subareas (the same 33 subareas that had been established in the Phase I Maximum Plan) would be evaluated. The information from the previous phase that was used in this analysis generally included:

- the extent of identified need
- the environmental issues
- · cost analysis factors
- implementation factors

Additional information was incorporated into the prioritization matrix as potential off-site solutions for subareas were further examined and evaluated.

The final matrix established criteria to help rank the level of need identified in each subarea including: the potential environmental and public health impacts (positive and negative), cost-effectiveness, potential growth impacts and the implementation issues related to providing off-site service to each subarea. In the end, this matrix evolved into a multipurpose tool, and was also used in determining project implementation and construction phasing.

SUBAREAS ELIMINATED FROM FURTHER OFF-SITE CONSIDERATION

A second matrix analysis was done for the lower ranking subareas in the prioritization matrix to determine whether or not these areas should continue to be considered for an alternative form of wastewater management. This analysis evaluated the subareas where the majority of parcels with identified need were categorized as 'on-site possible.' The result of this matrix analysis was that approximately half of the original 33 subareas were eliminated from further consideration for an off-site wastewater management solution. These areas will continue to use on-site systems for wastewater management.

PRELIMINARY LAYOUT ANALYSIS

Preliminary layouts were created for the remaining subareas with potential for off-site solutions. These preliminary layouts included schematics of where required facilities (pipeline, pump stations, connections to the existing sewer system, treatment systems, discharge fields, etc.) potentially could be located. Multiple preliminary layout alternatives were created for each of the subareas and the alternatives were compared on the basis of feasibility, relative ease of implementation, and cost-effectiveness. From this comparison, a preferred alternative for off-site wastewater management was established for each subarea analyzed.

RECOMMENDED PLAN

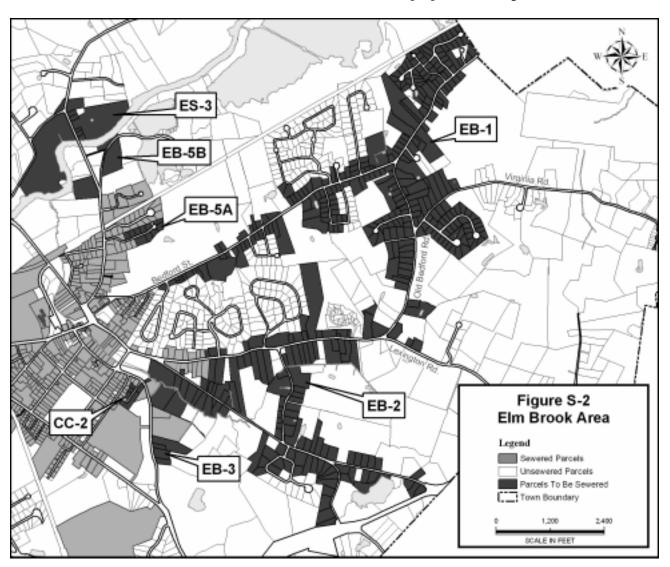
THREE RECOMMENDED PLAN COMPONENTS

▼ he Recommended Plan for wastewater management in Concord includes three main components: A. Extension of the existing centralized sewer system, B. Construction of localized collection systems and neighborhood treatment systems, and C. Continued use of on-site systems. The following provides a list of areas where these different components are proposed. These areas are also shown in Figure S-1, "Recommended Plan Areas" on the inside front cover of this summary.

A. EXTENSION OF THE EXISTING CENTRALIZED COLLECTION SYSTEM TO THE FOLLOWING AREAS:

Figure S-2 Portions of the Elm Brook area in eastern Concord including:

 approximately 276 parcels in the Bedford Street/Old Bedford Road area (EB-1) serving: the properties on Bedford Street, Minot Road, Butternut Circle, Fox Lane, Mallard Drive, Black Duck Road, Birch Drive, Dalton Road, Philip Farm Lane and Kenney Lane; a large number of properties on Ridgeway Road, Meriam Road and the northern portion of Old Bedford Road; and several properties on Virginia Road.



- approximately 153 parcels in the Lexington Road area (EB-2) serving: the properties on Hawthorne Lane, Cambridge Turnpike and Sandy Pond Road; and a large number of properties on Lexington Road, Mildred Circle and the southern portion of Old Bedford Road.
- approximately 4 parcels in the Walden Street area (EB-3) serving the properties on Walden Street across from the Alcott Elementary School.
- approximately 10 parcels in the Martin Road (EB-5A) and the Great Meadows Road area (EB-5B) serving the properties on Martin

Road that are not currently sewered and a few properties at the west end of Great Meadows Road.

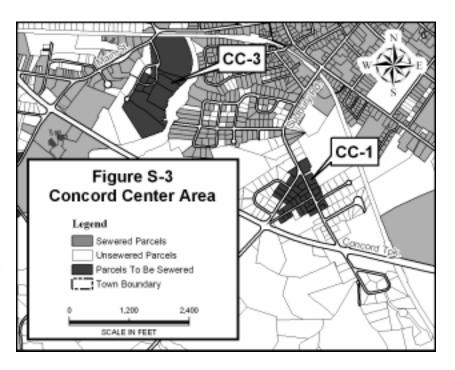
Figure S-3 Portions of the Concord Center area including:

- approximately 42 parcels in the Fairhaven Road area (CC-1) serving a large number of properties on Fairhaven Road and Potter Street and several properties on Sudbury Road.
- approximately 6 parcels in the Magnolia Street area (CC-2) serving the properties on Magnolia Street. (Figure S-2, Page 8)
- approximately 17 parcels in the Coolidge Road area (CC-3) serving several properties on Coolidge Road and Oak Road.

Figure S-4, Page10

Portions of the West Concord area, including:

- approximately **83** parcels in the Prairie Street area (WC-1) serving properties on Prairie Street, Westvale Drive, Central Street, Frances Street, Shirley Street and Chase Road.
- approximately 21 parcels in the Harrington Avenue area (WC-2) serving several properties on



Tarbell Spring Road, Ministerial Drive and the western end of Harrington Avenue.

- approximately 64 parcels in the Main Street/Hayward Mill Road area (WC-3) serving the properties on Winslow Street, off Harrington Avenue and the northern portion of Hayward Mill Road; and several of the properties on Main Street, Water Street and the eastern end of Harrington Avenue.
- approximately 34 parcels in the North Branch Road area (WC-4) serving the properties on North Branch Road and Hayes Road; and several of the properties on the southern end of Main Street.
- approximately 11 parcels in the MacArthur Street area (WC-9) serving several of the properties on the northern end of MacArthur Street.
- approximately 7 parcels in the Sunnyside Lane area (WC-10) serving several of the properties on Sunnyside Lane.

A small area in the Fairhaven neighborhood including:

• approximately 8 parcels in the Meadow Ridge Road area (FH-2) serving several of the properties on Meadow Ridge Road and a few properties on Old Marlboro Road and Cottage Street.

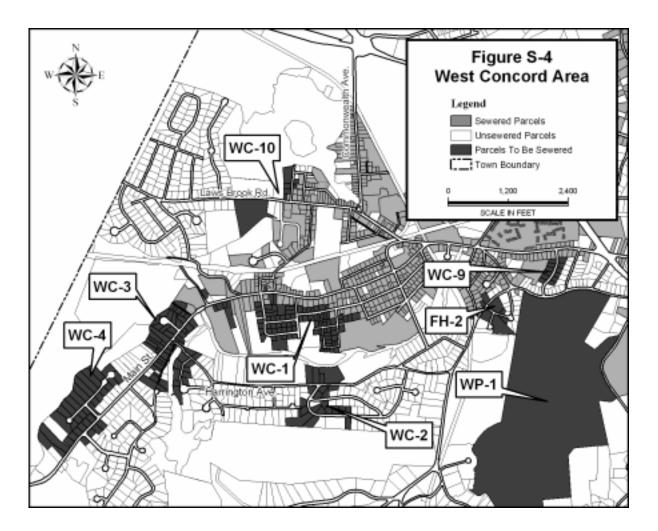


Figure S-2, Page 8 A small area in the Estabrook neighborhood including:

approximately 8 parcels in the Monument Street area (ES-3); serving several of the properties on Monument Street near the Concord River crossing. This area is difficult to serve due to its location and will require crossing of the Concord River via the Monument Street bridge. Sewer service extension to this area will depend on the completion of the planned Flint Bridge reconstruction project on Monument Street.

B. CONSTRUCTION OF LOCALIZED **COLLECTION SYSTEMS AND NEIGHBORHOOD TREATMENT SYSTEMS** IN THE FOLLOWING AREAS:

Figure S-5, Page 11

• approximately 139 parcels in the White Pond area (WP-1) serving the properties on Mitchell Road, White Avenue, Tracy Street, Paul Street, Granby Street, Preston Street, Seymour Street, Shore Drive, Bolton Street, Darton Street, Eaton Street, Dover Street, Hemlock Street, Varick Street and Fern Street; and several of the properties on the south side of Powder Mill Road and on the west side of Plainfield Road.

The location(s) for the treatment and discharge of wastewater from area WP-1 has not yet been determined.

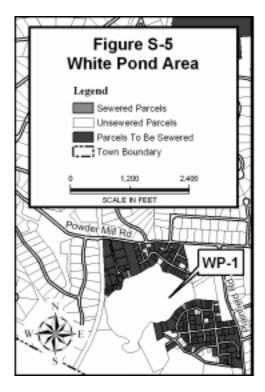


Figure S-6

• approximately 104 parcels in the Conantum (Kalmia Woods Association) area (FH-1) serving the properties on Heath's Bridge Road, Holdenwood Road, West Circle, East Circle, The Valley Road, Holden Lane, King Lane and Oxbow Road; and several of the properties on the east side of Sudbury Road and Garfield Road.

The site(s) for the treatment and discharge of wastewater from area FH-1 potentially could be located

on a portion of the commonlyowned Kalmia Woods Association parcel (Parcel ID 3547). There are unresolved issues regarding a conservation restriction that would need to be addressed prior to proceeding with the use of this site. The Association has not yet held a vote of its members to use this site.

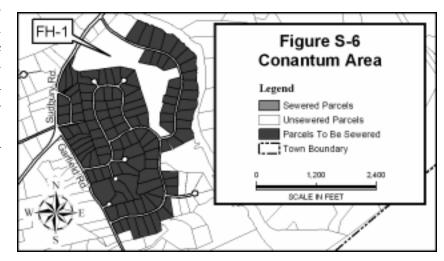
C. CONTINUED USE OF INDIVIDUAL ON-SITE SYSTEMS FOR WASTEWATER

TREATMENT & DISPOSAL IN OUTLYING AREAS OF CONCORD TO THE NORTH AND SOUTH AND IN ANY AREA NOT CURRENTLY CONNECTED TO THE CENTRALIZED SYSTEM AND NOT BEING PROPOSED FOR SEWERS OR NEIGHBORHOOD TREATMENT SYSTEMS.

A limited number of subareas have been identified as areas with potential to manage wastewater needs by constructing some type of shared Title 5 system. In order for these areas to proceed towards an alternate wastewater management system, the neighborhood would need to identify a nearby location for a shared system and work with the Board of Health to file necessary permit applications and determine system design requirements. These areas include the following: (see Figure S-1)

- Shadyside Avenue Area (EB-4)
- Strawberry Hill Road Area (SB-1)
- Commerford Road Area (SB-2)
- Barrett's Mill Road Area (SB-3)
- Border Road Area (WC-5) and Hunter's Ridge Road Area (WC-7)
- Upland Road Area (WC-6)

All parcels in town lying outside the recommended sewer service areas have been recommended to continue to be served via Title 5 on-site systems. On page 16 of this document, an Enhanced On-Site Program for wastewater management is described. This important initiative was developed by the Board of Health.



RECOMMENDED COLLECTION AND TRANSMISSION SYSTEMS

COMBINATION OF CONVENTIONAL GRAVITY SEWERS AND LOW PRESSURE SEWERS

he recommended collection and transmission system for both the centralized and neighborhood wastewater management solutions is a 'hybrid system': a combination of conventional gravity sewers, pump stations and force mains, and low pressure sewers.

CONVENTIONAL GRAVITY SEWERS

Conventional gravity sewers consist of large diameter pipes (typically 8-inch minimum diameter) that receive flow directly from individual properties without the use of pumps or pressure. These systems use a natural downward slope along the pipeline to transmit the wastewater by gravity. In some areas the natural topography slopes down to a low point, but the next section of downward slope required to keep the flow moving to the treatment location is not adjacent to this low point. This situation requires the use of a pump station to 'lift' the flow to the next downward section. The pipeline that connects the pump station to the next segment of gravity sewer is called a force main.

Low Pressure Sewers

Low pressure sewers consist of small diameter pipelines (typically 1.5-inch to 4-inch diameter) which receive flow from individual grinder pumps (belowground units) located on properties where homes are at a lower elevation than the existing roadways where the sewers are located. These systems require pressure to transmit the wastewater from the low areas to a higher elevation where the low pressure sewers connect to conventional gravity pipelines. Generally, areas adjacent to water bodies or other low-lying properties in Concord will require service using low pressure systems.

THE RECOMMENDED PLAN

The Recommended Plan includes construction of approximately

- 23 miles of gravity sewer pipeline
- 10 small pump stations and 2 existing pump station upgrades
- 5 miles of force main pipeline
- 4 miles of low pressure sewer pipeline

This hybrid system will transmit flows from individual homes to the existing collection system or directly to a neighborhood treatment site for treatment and final disposal. New flows going to the town's wastewater treatment plant will require existing collection system upgrades including:

- Replacing some pipelines that have insufficient capacity to handle the proposed flows.
- Upgrading pump stations (including Lowell Road and West Concord (Assabet) pump stations) to extend life and improve capacity to handle proposed flows.
- Rehabilitating and repairing some older pipelines to remove extraneous flows (infiltration and inflow).

RECOMMENDED TREATMENT SYSTEMS

USE OF EXISTING WASTEWATER TREATMENT PLANT AND TWO NEIGHBORHOOD TREATMENT SYSTEMS

astewater collected in the centralized sewer system from the areas outlined on pages 8-10, Recommended Plan Component A will be treated at the WWTP (located off Bedford Street) along with present system flows.

WWTP CAPACITY

The WWTP has a permitted discharge capacity of 1.2 million gallons per day (mgd); it currently processes approximately 80% of that design capacity on an average annual basis. There is no anticipated need to increase plant capacity beyond the 1.2 mgd permitted limit to treat the additional wastewater flows from the sewer extensions included in the Recommended Plan.

WWTP IMPROVEMENTS

The WWTP will require certain improvements to address existing deficiencies in the facility and future changes in the effluent quality parameters of the discharge permit. These improvements are currently expected to include:

- Replacement of the degritting system that is nearing the end of its useful life.
- Changes to the effluent filtration system, currently achieved through sand filter beds.
- · Provisions for additional phosphorus removal to address lower permit limits that may be set by the state and federal regulatory agencies.

These improvements are being incorporated into the Sewer Fund's Capital Improvement Program and will be addressed regardless of the implementation of the Recommended Plan for sewer system improvements.

Treated wastewater (effluent) from the WWTP will continue to be discharged directly to the surface waters of the Concord River, as permitted by the State.

INFILTRATION/INFLOW REMOVAL

It is recommended that the Town continue its infiltration/inflow (I/I) removal program to eliminate extraneous flows from the centralized sewer system. The removal of I/I is anticipated to allow the Town to continue to operate within the permitted capacity of the WWTP for the foreseeable future.

NEIGHBORHOOD TREATMENT SYSTEMS

Wastewater collected in the two localized collection areas described on pages 10-11, Recommended Plan Component B will be treated in new neighborhood treatment systems. Each NTS will consist of a small above-grade structure enclosing some of the treatment equipment and a series of below ground tanks to store and process the wastewater. An NTS produces a higher quality effluent than an individual on-site system. The effluent will be discharged to a groundwater discharge field, which works much like the leaching field of an individual on-site system. Based on the flows estimated for the White Pond collection area and the Conantum (Kalmia Woods Association) collection area, the approximate size of these discharge fields is expected to be 23,000 square feet and 10,000 square feet, respectively (all components of the discharge system would be below ground).

RECOMMENDED PLAN COSTS

nother very important aspect of the Recommended Plan is the estimation of project costs and determination of how those costs will be paid. This is a complex process and the estimates given to date are still subject to change based on current uncertainties, including the final siting decisions for the neighborhood treatment systems.

PROJECT COSTS

To effectively generate estimates of project costs, Weston & Sampson completed preliminary design layouts for each service area. These layouts include: pipeline locations, types and sizes; pump station locations and sizes; and preliminary locations, types and sizes for the neighborhood treatment systems. Using these layouts, a detailed project cost estimate was generated, as summarized in Table S-2, below.

TABLE S-2 SUMMARY OF ESTIMATED TEN-YEAR CAPITAL PROJECT COSTS

Collection System Cost \$ 10.9 million

Transmission System Cost \$ 4.1 million

Treatment Component Cost (1) \$ 3.1 million

Engineering & Contingency \$ 8.2 million

Total Estimated Cost \$ 26.3 million

(1) Includes estimated costs for NTS construction. Future costs related to treatment improvements at the existing WWTP and inflow/infiltration removal are not included in this estimate, but are carried in the Town's Capital Improvement Plan budget.

COST ALLOCATION

Payment for project costs will be distributed among three groups:

- Individual property owners who own frontage on the new sewer utility (whether it be centralized or a NTS) will be assessed a betterment.
- Town taxpayers as a whole will see an increase in their local taxes.
- Users of the Concord sewer system (both new users and existing users) will be billed a user fee, slightly higher than currently charged.

While the exact percentage distribution to each group has not been decided, the fundamental basis for the distribution has been determined. The Wastewater Planning Committee recommends that the group that directly benefits – the individual property owners who own frontage on the new utility – should pay the most substantial share. The group that will benefit indirectly from the public health and environmental protection provided by the plan – the town taxpayers – should also contribute. Finally, the group that will benefit by having a larger customer base to share future operating and capital costs – the sewer users – should also contribute.

RECOMMENDED COST ALLOCATION

A proposed distribution of 82% of the project cost paid through betterments, 10% paid through taxes, and 8% paid through user charges has been recommended by the Wastewater Planning Committee. The recommended cost allocation and other relevant concerns have been considered by the Board of Selectmen, members of the Finance Committee, the Town Finance Director, and the Town Manager. Considerable community discussion has also taken place. The Board of Selectmen will make the final decision on cost allocation and the Public Works Commission will vote the actual betterment charges after a public hearing process.

A combination of General Fund and Sewer Fund sources is proposed for funding design costs since money collected from betterments will not be available until each phase is implemented and construction is complete.

The percent distribution referenced above translates to the approximate costs to individual homeowners shown in Table S-3 below.

TABLE S-3 APPROXIMATE COST TO INDIVIDUAL HOMEOWNER

(based on cost allocation of approx. 82% Betterments, 10% Taxes, 8% Users)

	New Sewer User	Current Sewer User	Non-Sewer User		
	Average Annual Cost				
Betterment Cost*	\$1,650 (1 st year) \$ 850 (20 th year)	*			
Local Tax Impact	, , , , , , , , , , , , , , , , , , , ,				
(\$500,000 home)	\$ 20	\$20	\$20		
User Charge**	\$ 650††	\$30 increase	_		
Total Annual Cost	\$2,320 to \$1,520	\$50	\$20		
		One-time Cost [†]			
Sewer Improvement Fee*** (3 bedroom home)	\$5,200††	_	_		

^{*} Range of annual cost if financed over 20 years at 5% interest. Annual payments are fixed principal, declining interest. The betterment can be paid in one lump sum of approximately \$16,300 instead of over the 20-year period.

^{**} User charges may be more or less depending on actual customer water use.

^{***} Sewer Improvement Fee amount will vary based on the number of bedrooms in each individual home.

[†] In addition to the costs shown in this table, each homeowner will be responsible for the arrangements and the costs (anticipated to range from \$1,000 to \$8,000) to extend their sewer service from their home to the street.

^{††} Sewer Improvement Fee and User Charges are not required to be paid until time of connection to the sewer/NTS system.

ENHANCED ON-SITE PROGRAM

s an integral part of the CWMP, a separate consultant team, Stone Environmental, Inc. and BETA Group, Inc., completed a review of the services provided by the Board of Health and the existing regulations available for on-site wastewater (septic) disposal systems. The purpose of this analysis was to develop a comprehensive program with policies that would help the Town and individual homeowners to more effectively manage the use of on-site systems.

INTEGRATED WASTEWATER MANAGEMENT SYSTEM

An important benefit of the initial wastewater planning effort was the development of a computerized Integrated Wastewater Management System (IWMS). The IWMS is one of the first comprehensive systems in the Commonwealth. This system is comprised of an up-to-date database of all known existing on-site system information in town, combined with the Stone Environmental/Lombardo Associates wastewater planning information, United States Geological Survey and other local information on soils, wetlands, groundwater elevations, etc. This database of information is linked to the Town's geographic information system (GIS) and is updated on a continual basis. This combined system provides the foundation for development of the program to manage the use of on-site systems.

ON-SITE MANAGEMENT PROGRAM

Based on this analysis, the consultants developed recommendations for additional services that could be provided by the Board of Health to those residents who will continue to use on-site systems. Additionally, recommendations were made for changes in Board of Health regulations to ensure that existing on-site systems (especially in environmentally sensitive areas) do not have the potential to negatively impact public health and environmental resources.

Concord's on-site management program will be a part of the new Board of Health regulation entitled "CBHR 3.00: On-site Disposal Systems." In addition to establishing standards for on-site/decentralized wastewater management, this regulation will also address operation and inspection of existing on-site systems, review of building additions and changes, design and construction of new systems, and on-site system service vendors. The regulation will allow the Board of Health to rank-order all unsewered parcels in town according to potential impacts on the public health, and to prioritize those parcels for review purposes using the Town's GIS.

Details regarding this analysis and recommendations for on-site management are included in the report titled, "July 31, 2002, On-site/Decentralized Wastewater Management Program: Final Report." For further information, contact the Board of Health office at:

141 Keyes Road Concord, MA 01742 T: 978-318-3275 F: 978-318-3281

GROWTH MANAGEMENT PLANNING

'n concert with the development of the Recommended Plan and the Enhanced On-site Pro-L gram, the Planning Board is developing a plan to manage potential growth impacts related to changes in wastewater management (off-site solutions, generally speaking). Early in the Comprehensive Wastewater Planning process, residents voiced concerns about potential growth impacts resulting from improved management of wastewater in areas with high ground water, steep slopes, poor soils, small lot areas and other such conditions. The Planning Board, working with the consulting firm of Horsley & Witten, is developing a Growth Management Plan in tandem with the development of the Recommended Plan (presented on pages 8-11 of this document). Such a plan is necessary to insure Concord's future public health, safety and welfare, since both developed and undeveloped lots can be impacted by proposed wastewater solutions. Different growth management tools can help ensure that neighborhoods grow and change in a manner that is consistent with the vision of the residents.

NEIGHBORHOOD MEETINGS

The growth management subcommittee of the Planning Board held meetings in January 2003 with the two neighborhoods recommended to receive sewer extensions in the first construction phase - portions of Elm Brook and West Concord. The goal of these meetings was to gain an understanding of the vision residents have of their neighborhoods. This was done through discussion of the unique characteristics of each neighborhood and presentation of the different tools available to control growth, to obtain feedback from residents about their concerns and ideas for strategies they might favor to maintain the character of their particular neighborhood. Growth management questionnaires/surveys were distributed at these meetings. A copy of the survey form can be

obtained by contacting the Town's Department of Planning and Land Management - Planning Division office at:

141 Keyes Road Concord, MA 01742 T: 978-318-3290 F: 978-318-3291

POTENTIAL **GROWTH MANAGEMENT TOOLS**

The growth management tools that are being discussed include the following:

- Changes to Sewer Regulations.
- Built-in limitations on capacity for Neighborhood Treatment Systems.
- Changes to the Zoning Bylaw.
- Creation of an Historic or other Neighborhood Overlay District.
- Acquisition of open space or other open space protection measures.

The Elm Brook neighborhood includes residential, conservation and agricultural lands. The area has a high groundwater table, which has likely prevented some building expansion and new development (but not all such development). Mounded on-site systems are commonly required. Given the open nature of the Elm Brook area and the high groundwater table, open space protection, on both a large scale and individual lot scale, should be given special attention as a growth management tool.

The West Concord neighborhood includes a mix of lot sizes and uses, featuring many small, nonconforming residential lots. The housing stock varies in age from the early 1900's to the 1970's and is currently of modest size. Expansion on a property is limited by the location and space needed for an on-site system and by current zoning that requires setbacks from front, rear and side lot lines and by limiting the height of the house to 35 feet (to the mid-point of the roof, if the roof is peaked).

Growth Management is a critical component of the Comprehensive Wastewater Management Plan. Tools to address growth management in the different neighborhoods receiving new wastewater management service will be developed prior to seeking the Town's approval for construction funds to implement any phase of the Recommended Plan.

PLAN IMPLEMENTATION

RECOMMENDED PLAN IMPLEMENTATION

he plan has been divided into four phases recommended to be implemented over the next ten years so as to minimize the financial impact on the Town while ensuring proper construction and project oversight. The recommended construction phasing for the proposed off-site solutions is summarized in Table S-4 below, and is also shown on Figure S-7, "Town of Concord, Massachusetts, Comprehensive Wastewater Management Plan: Recommended Phasing, January 11, 2003" on the inside back cover of this summary.

CONCLUSION

The intent of the CWMP is to provide off-site wastewater solutions (sewer extensions or neighborhood treatment systems) only to those areas of Concord that should not continue to rely on on-site systems for long-term wastewater treatment and disposal.

2003 Town Meeting Article 36:

Based on the information presented in this document and information that has been provided throughout the wastewater planning process, the town will be asked to vote, under Article 36 at the 2003 Town Meeting, to support the Town of Con-

TABLE S-4 RECOMMENDED CONSTRUCTION PHASING FOR OFF-SITE SOLUTIONS *

Constru	ction Phases	Subareas Included		
Phase 1	2004-2006	Prairie St. Area (WC-1), Bedford St./Old Bedford Rd. Area (EB-1)		
Phase 2	2006-2008	Walden Street Area (EB-3), White Pond Area (WP-1), Martin Road Area (EB-5A), Magnolia Street Area (CC-2), Conantum (Kalmia Woods Association) Area (FH-1)		
Phase 3	2008-2010	Lexington Road Area (EB-2), Sunnyside Lane Area (WC-10), Meadow Ridge Road Area (FH-2), MacArthur Street Area (WC-9), Main Street/north Hayward Mill Road Area (WC-3)		
Phase 4	2010-2012	Harrington Avenue Area (WC-2), Coolidge Road Area (CC-3), Fairhaven Road Area (CC-1), North Branch Road Area (WC-4), Monument Street Area (ES-3), Great Meadows Road Area (EB-5B)		
		*Subject to Town Meeting and voter approval		

cord, Massachusetts Comprehensive Wastewater Management Plan. Article 36 does not appropriate any funds. An affirmative vote will confirm that the majority of the Concord Town Meeting believes this plan is in the best interests of the Town and want the Town to proceed by filing for State regulatory review and approval.

ARTICLE 37:

The next step in this process is the design of the first phase of the Recommended Plan – sewer extensions for the areas of West Concord and Elm Brook. A total of \$300,000 General Fund appropriation for this design will be requested under Article 37 at the 2003 Town Meeting. A matching amount (\$300,000) will be funded by the Sewer Fund.

Each phase of the plan will be voted separately. The separation of support and funding for the plan is important to the future of the project because even though voters may support the plan, they may not be ready to expend funds to proceed in a particular year. As can be seen in Table S-5 below, construction of Phase 1 and the three subsequent phases will be contingent on separate funding votes at future Town Meetings. These future votes will also require debt exclusion overrides at the polls for construction funding to build each phase of the Recommended Plan.

TABLE S-5 SCHEDULE OF ANTICIPATED APPROPRIATIONS AND SPENDING

Town Meeting	Amount Appropriated	Fiscal Year Expended	Amount Expended	Description/Schedule
TM 03	\$ 600,000*	FY 04	\$ 600,000	Phase 1 Design and Permits
TM 04	\$7,420,000	FY 05	\$3,710,000	Phase 1 Construction &Phase 2 Design
TM 05		FY 06	\$3,710,000	Complete Construction Phase 1
TM 06	\$9,244,000	FY 07	\$4,622,000	Phase 2 Construction &Phase 3 Design
TM 07		FY 08	\$4,622,000	Complete Construction Phase 2
TM 08	\$6,174,000	FY 09	\$3,087,000	Phase 3 Construction &Phase 4 Design
TM 09		FY 10	\$3,087,000	Complete Construction Phase 3
TM 10	\$2,812,000	FY 11	\$1,406,000	Phase 4 Construction
TM 11		FY 12	\$1,406,000	Complete Construction Phase 4

^{* \$300,000} appropriated to be borrowed under Article 37, 2003 Town Meeting plus \$300,000 from Sewer Fund.

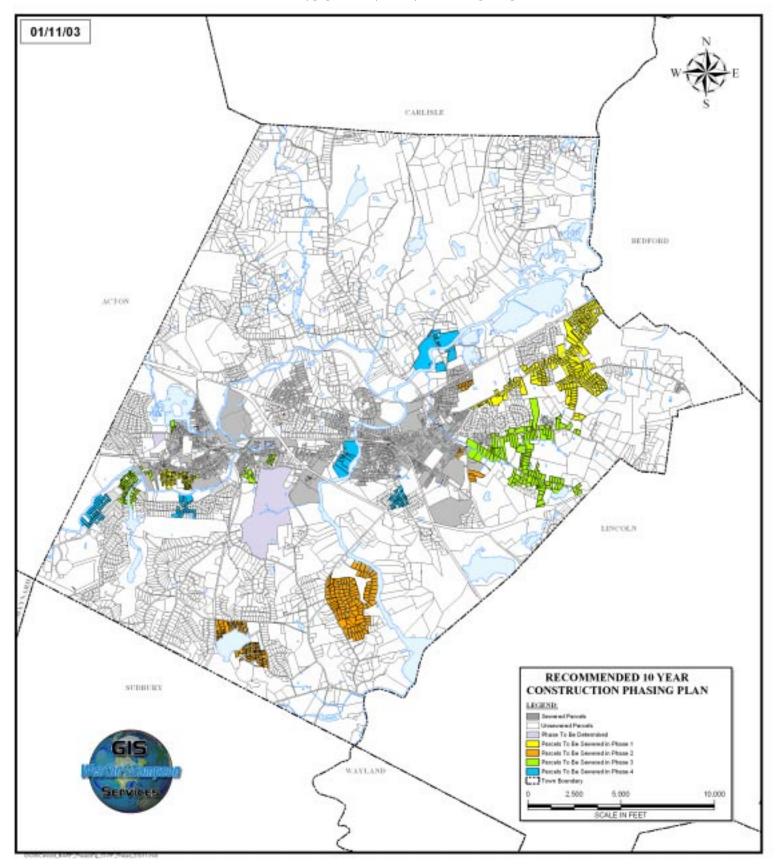
Notes			

FIGURE S-7

TOWN OF CONCORD, MASSACHUSETTS

COMPREHENSIVE WASTEWATER MANAGEMENT PLAN:

RECOMMENDED PHASING



This document includes the following information:

EXECUTIVE SUMMARY

BACKGROUND

- NEEDS ASSESSMENT
- PRELIMINARY ALTERNATIVES ANALYSIS
- FINAL ALTERNATIVES ANALYSIS

RECOMMENDED PLAN

RECOMMENDED COLLECTION AND TRANSMISSION SYSTEMS

RECOMMENDED TREATMENT SYSTEMS

RECOMMENDED PLAN COSTS

ENHANCED ON-SITE PROGRAM

GROWTH MANAGEMENT PLANNING

PLAN IMPLEMENTATION

MAPS:

TOWN OF CONCORD, MASSACHUSETTS COMPREHENSIVE WASTEWATER MANAGEMENT PLAN:

RECOMMENDED PLAN AREAS RECOMMENDED PHASING

Sources of further information:

- Town website <u>www.concordnet.org/dpw/w&s/html/newsletters.htm</u>
- Wastewater Planning Committee Newsletters
- CWMP Notebooks located at:
 - Concord Public Works
 - Town Libraries
 - Town House



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WASTEWATER PLANNING COMMITTEE

Charles W. Haldeman, Chair 384 Hayward Mill Road Michael Webster 59 Pilgrim Road Robert Guernsey 19 Border Road Judith K. Sprott 43 White Avenue

Jeffrey L. Eberle 15 Annursnac Hill Road Sharon M. Jones 8 Eaton Street Paul Feshbach-Meriney 33 Crest Street Steven Ng 12 Dalton Road